



IDEM's Surface Water Quality Assessment Program

Biological Studies Section

Program Objective

The Biological Studies Section (BSS) conducts ecological assessments of Indiana surface waters, providing its customers direct measurement of environmental quality and information on any changes over time of this quality. The assessment of environmental quality involves the direct and indirect measurements of numerous parameters within several media of the environment including: chemical analysis of specific water quality parameters, chemical analysis of surficial aquatic sediments, measurement of fish tissue contamination, acute and chronic toxicity of National Pollution Discharge and Elimination System (NPDES) effluents, aquatic habitat quality, fish community impairment, invertebrate community impairment, and lake eutrophication levels. The role of the BSS relative to these environmental media and the environmental indicators that we provide our customers are outlined in Table I.

The Biological Studies Section conducts studies of fish and macroinvertebrate communities, as well as stream habitats, to establish biological criteria to which all other streams may be compared in order to identify impaired streams or watersheds. This Section also conducts fish tissue and sediment sampling to monitor sources of toxic and bioconcentrating substances whose concentrations are often too low to be detected in other environmental media. Fish tissue data serve as the basis for fish consumption advisories which are issued to protect the health of those who consume fish caught in Indiana waters. Fish tissue data are also useful for wildlife health risk assessments for fish-eating birds and mammals, and for providing the information needed to develop models for assessing changes in the quality of Indiana ecosystems.

The BSS is responsible for determining the biological integrity of aquatic communities of Indiana streams and lakes. This is accomplished through a variety of field and laboratory studies that involve several different forms of aquatic life. These data are used to determine compliance with the existing narrative biological criteria in Indiana's current water quality standards, to determine the extent of ecological harm, and to make correlations to physical and/or chemical impairments which may occur.

The Section also oversees lake monitoring efforts conducted under contract by staff and students of the Indiana University School of Public and Environmental Affairs, as well as by a corps of trained volunteer monitors. Both programs include the monitoring of physical, chemical and/or biological parameters useful in assessing the impacts of nutrients in Indiana lakes and reservoirs.

The BSS participates in the review of requests for site-specific water quality criteria for waters influenced by NPDES discharges. In the course of its various monitoring and assessment field activities the staff finds point- and nonpoint source-related problems which are then referred to the appropriate IDEM programs. The Section also cooperates in monitoring and assessment of the Ohio River in conjunction with the Ohio River Valley Water Sanitation Commission (ORSANCO), and other state and federal agencies.

| Table I. Role of the Biological Studies Section Relative to Media and Ecological Data Collected and Expressed in Terms of Environmental Stressors, Responses and Indicators | | |
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| Chemical, Physical and Biological Stresses | Environmental Responses | Environmental Indicators Used to Assess Impairment |
| Point Source Pollution and Nonpoint Source Pollution | Elevated Pollutants in Water | Water Chemical Specific Concentrations and Loadings |
| | Elevated Pollutants in Aquatic Sediments | Sediment Chemical Specific Concentrations and Loadings |
| | Elevated Pollutants in Fish Tissue | Contaminant Bioconcentration in Fish Tissue, Fish Consumption Advisories |
| | Acute and Chronic Toxicity | Effluent Toxicity Tests |
| Destructive Habitat Alterations | Decreased Aquatic Habitat Quality | Aquatic Habitat Evaluation Index |
| Collective Ecosystem Level Responses to Environmental Stress | Fish Community Impairment | Fish Community Index of Biotic Integrity (IBI) |
| | Invertebrate Community Impairment | Macroinvertebrate Index of Biotic Integrity (mIBI) |
| | Lake Eutrophication | Indiana Trophic State Index |
| | | Carlson Trophic State Index |

Program Participants

The Section works directly with the other sections of the Assessment Branch including the Surveys Section and the Environmental, Toxicology and Chemistry Section. Work is conducted cooperatively with the Indiana Department of Natural Resources, Indiana State Department of Health, U.S.EPA, U.S. Geological Survey, U.S. Fish & Wildlife Service, U.S. Army Corps of Engineers, ORSANCO, local regulatory agencies, Indiana public and private school students and faculty, and staff and students of numerous state universities and colleges. Internal customers include various programs within IDEM's Offices of Land and Water Quality (OLQ and OWQ, respectively). Ultimate customers are the citizens and of Indiana.

Technical Notes

Please see the technical notes for the fact sheets listed in the Program Products section below.

Program Descriptions

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| Media: | Surface water; rivers, streams and lakes |
| Study Area: | Statewide |
| Site Selection Type: | <i>see fact sheets listed in Program Products section</i> |
| Sampling Sites: | <i>see fact sheets listed in Program Products section</i> |
| Sampling Frequency: | <i>see fact sheets listed in Program Products section</i> |
| Data Collected: | <i>see fact sheets listed in Program Products section</i> |

Program Products

- ▶ Fact Sheet: *Fish Community Sampling Program B* IDEM 32/01/004/1998 rev. 2001
- ▶ Fact Sheet: *Fish Tissue Contaminant Monitoring Program B* IDEM 32/01/005/1998 rev. 2001
- ▶ Fact Sheet: *Sediment Contaminant Monitoring Program B* IDEM 32/01/008/1998 rev 2001
- ▶ Fact Sheet: *Macroinvertebrate Community Assessment Program B* IDEM 32/01/007/199 rev.2001
- ▶ Fact Sheet: *Lake Monitoring Program -* IDEM 32/01/009/1998 rev 2001

Contact Information

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| <p>IDEM Information: (317) 233-1044 or 800-451-6027 800-743-3333(TDD) toll-free for Indiana residents</p> <p>EnviroLine: (317) 232-8603 or 800-451-6027 toll-free for Indiana residents</p> <p>Fax on Demand: 800-726-8000</p> <p>Internet: www.state.in.us/idem</p> | <p><u>For More Information on IDEM's Office of Water Quality...</u></p> <p>Assessment Branch (Surface water quality: river, streams and lakes) Shadeland Office, Indianapolis (317) 308-3173</p> <p>Permitting Branch (NPDES permits) Indiana Government Center North, Indianapolis (317) 232-8675</p> <p>Compliance Branch (facilities assistance, inspections and compliance) Indiana Government Center North, Indianapolis (317) 232-6770</p> <p>Drinking Water Branch (Public water supply and ground water protection) Shadeland Office, Indianapolis (317) 308-3280</p> <p>Planning & Restoration Branch (Water quality standards/rules, grants and loans) Indiana Government Center North, Indianapolis (317) 233-8488</p> |
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